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RESEARCH MEMORANDUM

AN ANALYSIS OF NAVY ENLISTED TOUR LENGTHS

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1. Enclosure (1) is forwarded as a matter of possible interest.
2. This Research Memorandum examines the length of tours completed in FY 1985 and 1986 by a sample of enlisted personnel. The distribution of completed tours is displayed. Comparisons of the distributions for subsamples of personnel with varying experience and in varying assignments are also conducted.

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AN ANALYSIS OF NAVY ENLISTED TOUR LENGTHS

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CENTER FOR NAVAL ANALYSES

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ABSTRACT

The Navy experiences a substantial amount of turnover among enlisted personnel. Some of this is unplanned (precontract attrition), but much of the turnover is the result of rotation or losses upon the completion of an enlistment contract. This research memorandum summarizes information on the actual length of completed tours for a sample of more than 10,000 tours completed in 1985 and 1986.

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INTRODUCTION

Navy enlisted personnel are assigned to billets for specified periods of time. Upon completion of a tour, personnel normally rotate to a new assignment. Rotation allows personnel to learn new skills, serve in assignments with increasing responsibility, and achieve a reasonable balance between assignments at sea and on shore. It also allows the Navy to assign personnel where the need is greatest.

There are drawbacks to the Navy's rotation policy. One is that it is expensive, both for the Navy and the families involved, to move frequently. Perhaps of equal importance, this rotation policy is potentially costly in terms of unit readiness. New personnel must be trained for their job, and they and their new units must adjust to each other. Numerous analyses have considered ways to reduce turnover and geographic instability while maintaining operational flexibility.

Normal rotation is not the only source of personnel turnover. Some turnover results when personnel leave active duty. The majority of these losses occur at the end of an enlistment term, but precontract attrition accounts for a significant portion of losses, particularly for junior personnel.

The goal of this analysis is to measure the actual length of tours for a large sample of personnel completing assignments in FY 1985 and 1986. These tours include both those that lasted until the projected rotation date and those that ended early. The analysis displays the distribution of tour lengths, assesses the differences among various subsamples, and compares, for example, the distribution of tour lengths for first-term personnel to that for career personnel.

Data were collected for 10,049 personnel who changed activities in those two years, excluding time at training facilities. Information was gathered about the assignment and on the individual's background, including length of service and paygrade.

The distribution of completed tour lengths (in months) is shown in table 1 and is displayed graphically in figure 1. The mean tour length is 27.1 months, with a standard deviation of 13.3. The distribution of tours is bimodal with two spikes in the distribution, around 24 months and 36 months. The median tour is 26 months.

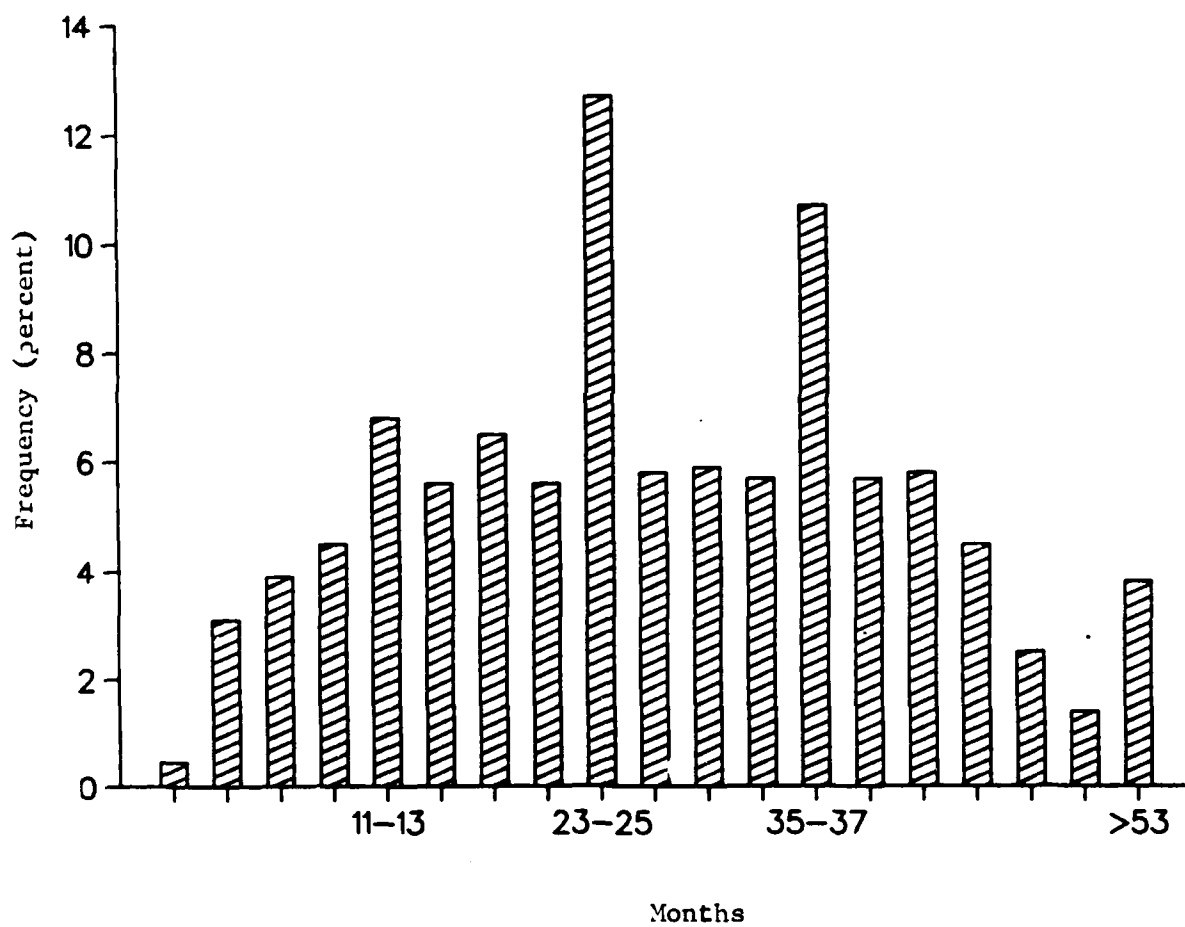


FIG. 1: LENGTH OF COMPLETED TOURS--FY 1985 AND 1986

TABLE 1
LENGTH OF COMPLETED TOURS

| <u>Months</u> | <u>Frequency</u> | <u>Percent</u> | <u>Cumulative percent</u> |
|---------------|------------------|----------------|-------------------------------|
| 1 | 44 | .4 | .4 |
| 2-4 | 314 | 3.1 | 3.6 |
| 5-7 | 391 | 3.9 | 7.5 |
| 8-10 | 450 | 4.5 | 11.9 |
| 11-13 | 683 | 6.8 | 18.7 |
| 14-16 | 565 | 5.6 | 24.4 |
| 17-19 | 653 | 6.5 | 30.8 |
| 20-22 | 562 | 5.6 | 36.4 |
| 23-25 | 1,276 | 12.7 | 49.1 |
| 26-28 | 582 | 5.8 | 54.9 |
| 29-31 | 592 | 5.9 | 60.8 |
| 32-34 | 570 | 5.7 | 66.5 |
| 35-37 | 1,072 | 10.7 | 77.2 |
| 38-40 | 573 | 5.7 | 82.9 |
| 41-43 | 585 | 5.8 | 88.7 |
| 44-46 | 454 | 4.5 | 93.2 |
| 47-49 | 256 | 2.5 | 95.8 |
| 50-52 | 144 | 1.4 | 97.2 |
| 53+ | <u>283</u> | <u>3.8</u> | 100.0 |
| Total | 10,049 | 100.0 | |

Personnel at numerous activities are included in these completed tour figures. Tour lengths differ substantially depending on the type of activity and the type of personnel assigned. The following tables and charts focus on the tour lengths observed within various subsamples of the data.

EXPERIENCE

This section examines tour lengths for personnel at varying experience levels. Tables 2 and 3 display the distribution of tour lengths, in months, for personnel in their first term and for more senior personnel in their second or subsequent terms, respectively.

TABLE 2
FIRST-TERM PERSONNEL

| <u>Months</u> | <u>Frequency</u> | <u>Percent</u> | <u>Cumulative percent</u> |
|---------------|------------------|----------------|-------------------------------|
| 1 | 33 | .6 | .6 |
| 2-4 | 241 | 4.1 | 4.7 |
| 5-7 | 273 | 4.6 | 9.3 |
| 8-10 | 301 | 5.1 | 14.4 |
| 11-13 | 457 | 7.8 | 22.2 |
| 14-16 | 402 | 6.8 | 29.0 |
| 17-19 | 484 | 8.2 | 37.2 |
| 20-22 | 337 | 5.7 | 42.9 |
| 23-25 | 646 | 10.8 | 53.7 |
| 26-28 | 323 | 5.5 | 59.2 |
| 29-31 | 369 | 6.3 | 65.5 |
| 32-34 | 315 | 5.4 | 70.9 |
| 35-37 | 350 | 5.9 | 76.8 |
| 38-40 | 368 | 6.3 | 83.0 |
| 41-43 | 414 | 7.0 | 90.1 |
| 44-46 | 309 | 5.2 | 95.3 |
| 47-49 | 90 | 1.5 | 96.9 |
| 50-52 | 74 | 1.3 | 98.1 |
| 53+ | 110 | 1.9 | 100.0 |
| Total | 5,887 | 100.0 | |

TABLE 3
DISTRIBUTION OF TOUR LENGTHS
(Second-Term and Career Personnel)

| <u>Months</u> | <u>Frequency</u> | <u>Percent</u> | <u>Cumulative percent</u> |
|---------------|------------------|----------------|-------------------------------|
| 1 | 11 | .3 | .3 |
| 2-4 | 73 | 1.8 | 2.0 |
| 5-7 | 118 | 2.8 | 4.9 |
| 8-10 | 149 | 3.6 | 8.4 |
| 11-13 | 226 | 5.4 | 13.9 |
| 14-16 | 163 | 3.9 | 17.8 |
| 17-19 | 169 | 4.1 | 21.8 |
| 20-22 | 225 | 5.4 | 27.2 |
| 23-25 | 640 | 15.4 | 42.6 |
| 26-28 | 259 | 6.2 | 48.8 |
| 29-31 | 223 | 5.4 | 54.2 |
| 32-34 | 255 | 6.1 | 60.3 |
| 35-37 | 722 | 17.3 | 77.7 |
| 38-40 | 205 | 4.9 | 82.6 |
| 41-43 | 171 | 4.1 | 86.7 |
| 44-46 | 145 | 3.5 | 90.2 |
| 47-49 | 166 | 4.0 | 94.2 |
| 50-52 | 70 | 1.7 | 95.9 |
| 53+ | 182 | 4.1 | 100.0 |
| Total | 4,162 | 100.0 | |

First-term personnel are defined as those who have served 72 months or less when they finish their tour. Since first-term service obligations range from four to six years, this definition should include all first-term personnel but may include some personnel in their second term. Second-term personnel are defined as those with six to ten years of service. Career personnel are defined as those with more than ten years in the Navy.

First-termers have an average tour length of 25.5 months, compared to an average of 29.3 for other personnel. There are differences in the tours of personnel in their second term vice career personnel, but they are quite small (figure 2). As shown in figure 3, first-term distribution is flatter and does not have the bimodal pattern seen for more senior personnel.

First-termers are much more likely to serve a short tour, due in large part to the significant number (15 percent) of first-termers who leave before the end of their obligated tour.¹ The mean tour length for personnel who complete their first term successfully is 26.9 months, closer to the mean for senior personnel but still significantly lower. Figure 4 compares the tour length distributions for successful first-termers and senior personnel.

Table 4 displays the length of completed tours, by enlistment term, for personnel who remain in the Navy after completion of their enlistment term, leave at the end of their term, or leave early. There are substantial differences overall, but most of the difference results from differences in tour length among first-termers.

First-termers who leave before the end of their enlistment have very short tours. Those who leave at the completion of their term have relatively long tours since they are not reassigned near the end of an enlistment. First-termers who rotate normally serve tours nearly half a year shorter than comparable second-term and career personnel.

SEA VS. SHORE ASSIGNMENTS

Assignments to billets at sea and on shore differ in many ways. Figure 5 displays tour lengths for the two types of assignments.² The

1. First-term precontract attrition rates are substantially higher than 15 percent. This sample excludes tours at training facilities and therefore does not capture attrition that occurs in recruit or initial skill training.

2. Sea and shore billets are defined based on whether they count as sea duty for rotation purposes. Sea duty is identified by a sea/shore code of 2 through 5 on the Enlisted Master Record (EMR) and shore duty by a code of 1 or 6.

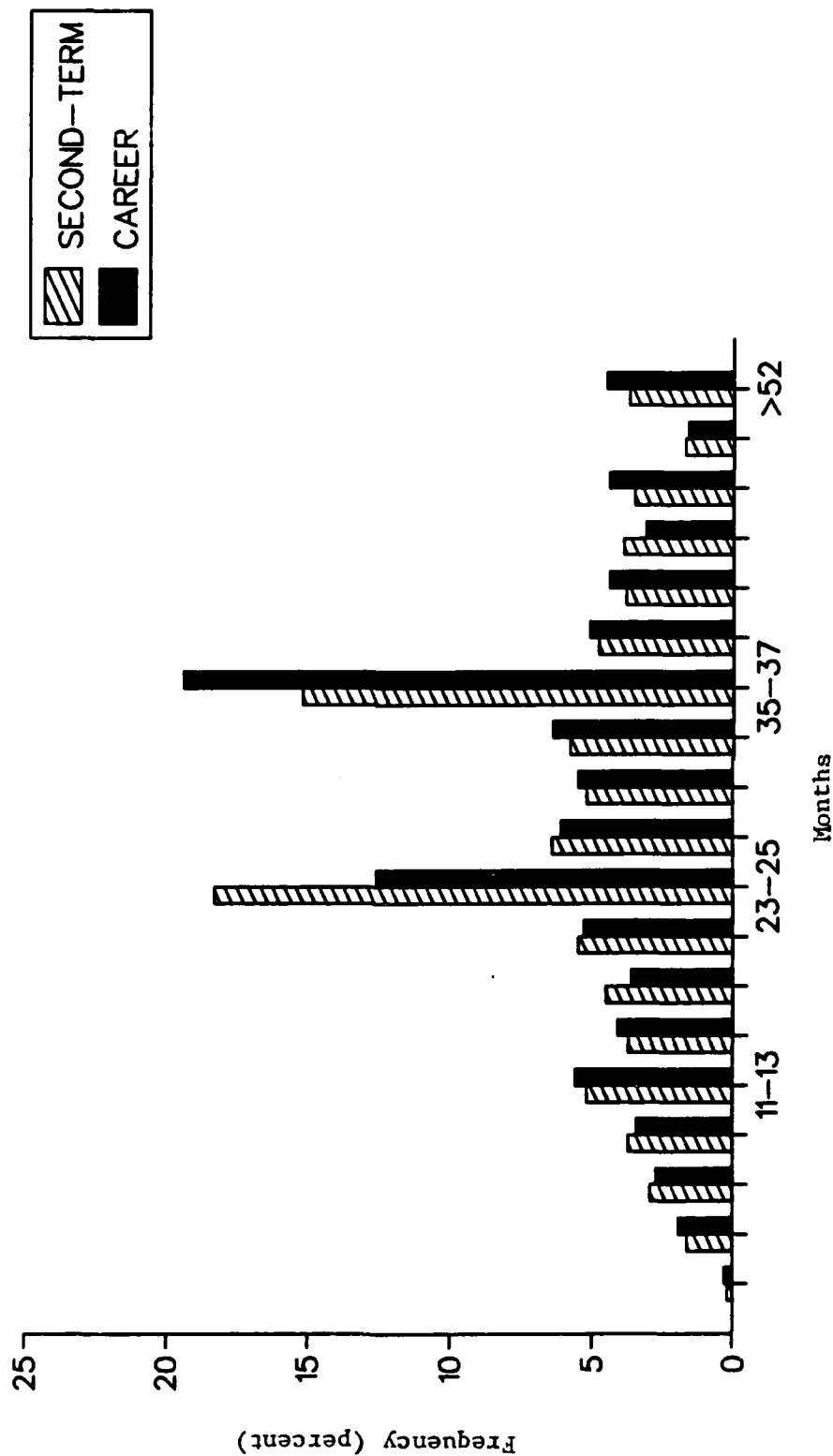


FIG. 2: LENGTH OF COMPLETED TOURS (SECOND-TERM AND CAREER PERSONNEL) FY 1985 AND 1986

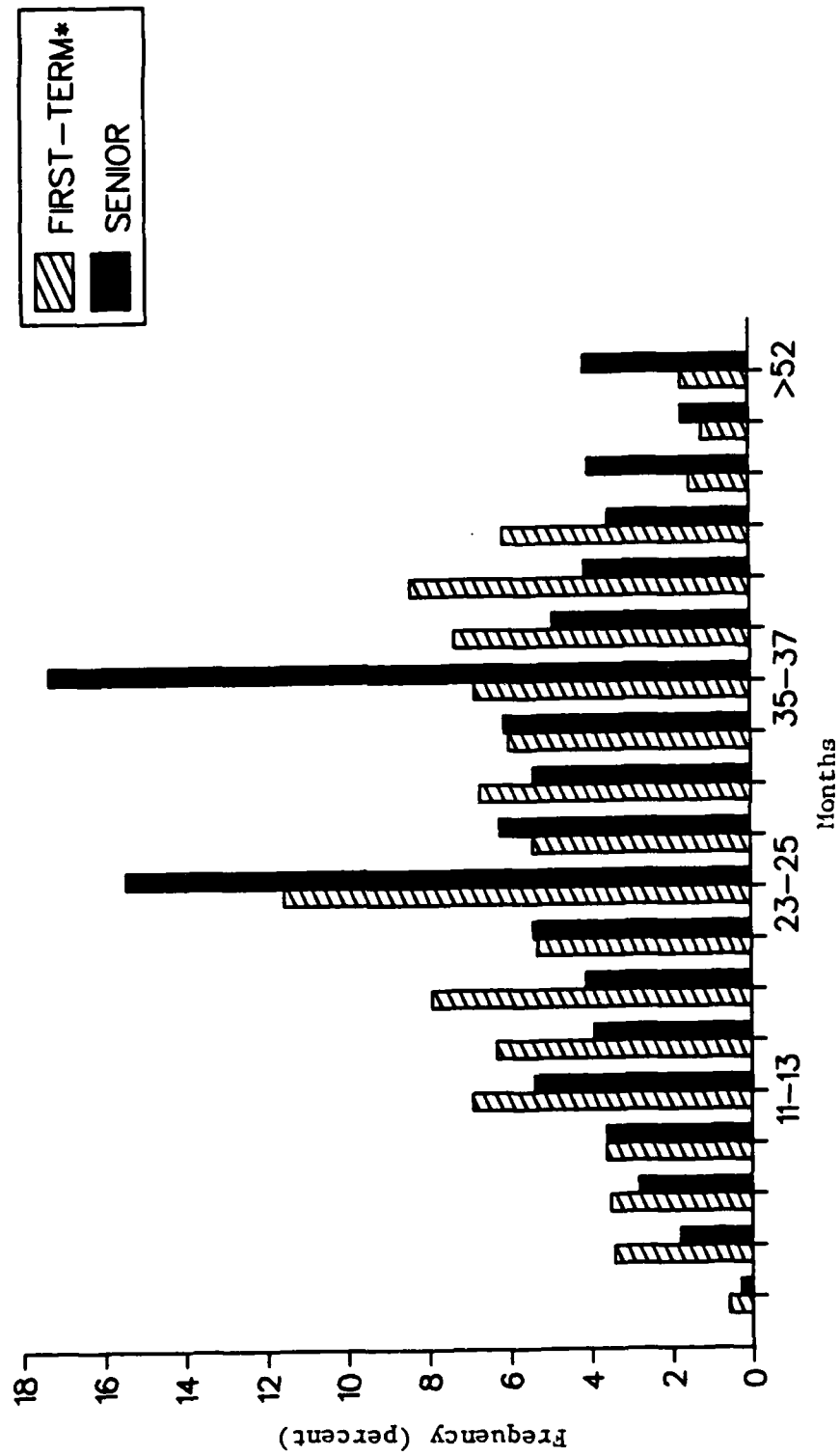


FIG. 3: LENGTH OF COMPLETED TOURS (FIRST-TERM AND SENIOR PERSONNEL) FY 1985 AND 1986

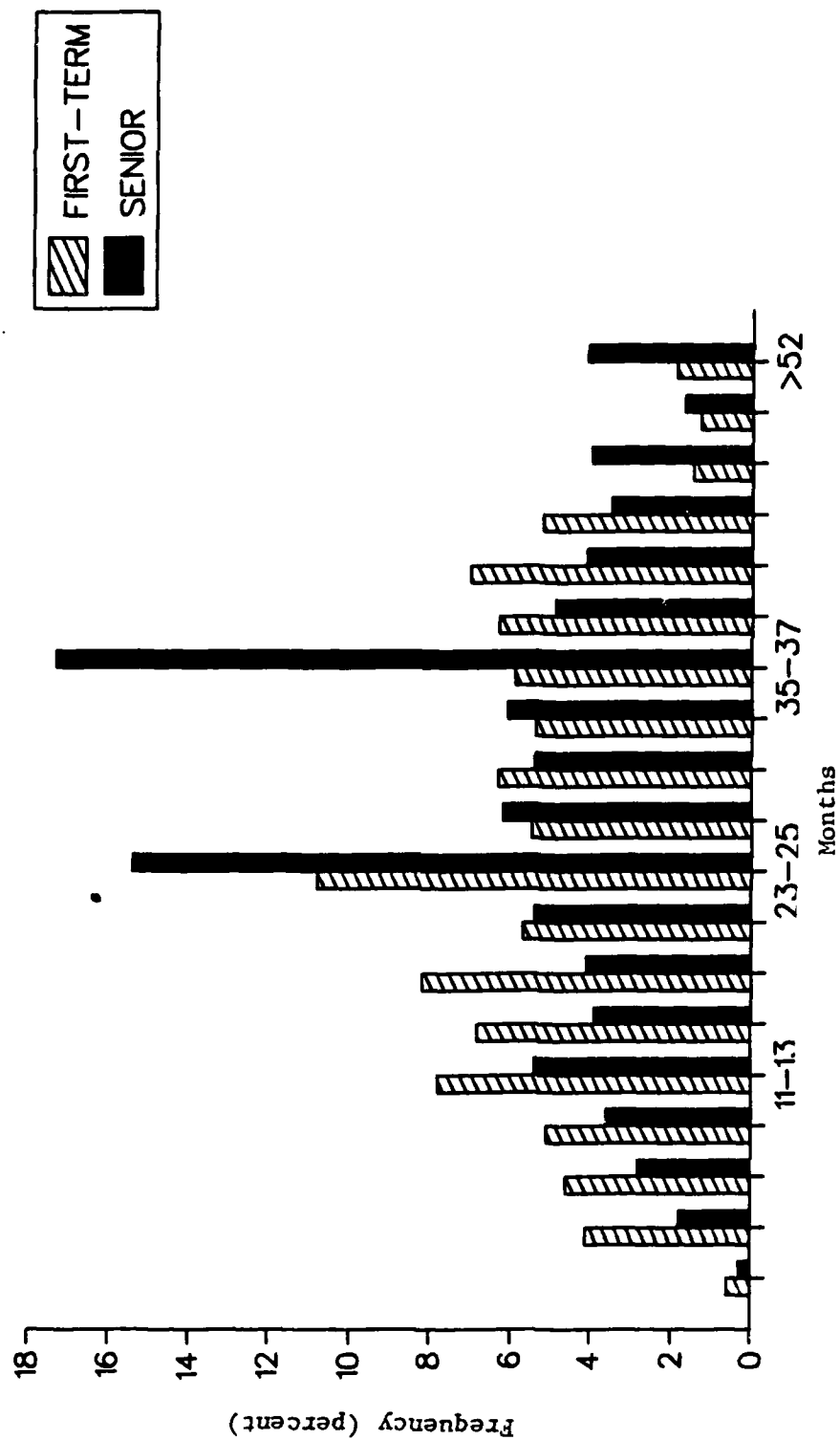


FIG. 4: LENGTH OF COMPLETED TOURS (SUCCESSFUL FIRST-TERM AND SENIOR PERSONNEL)

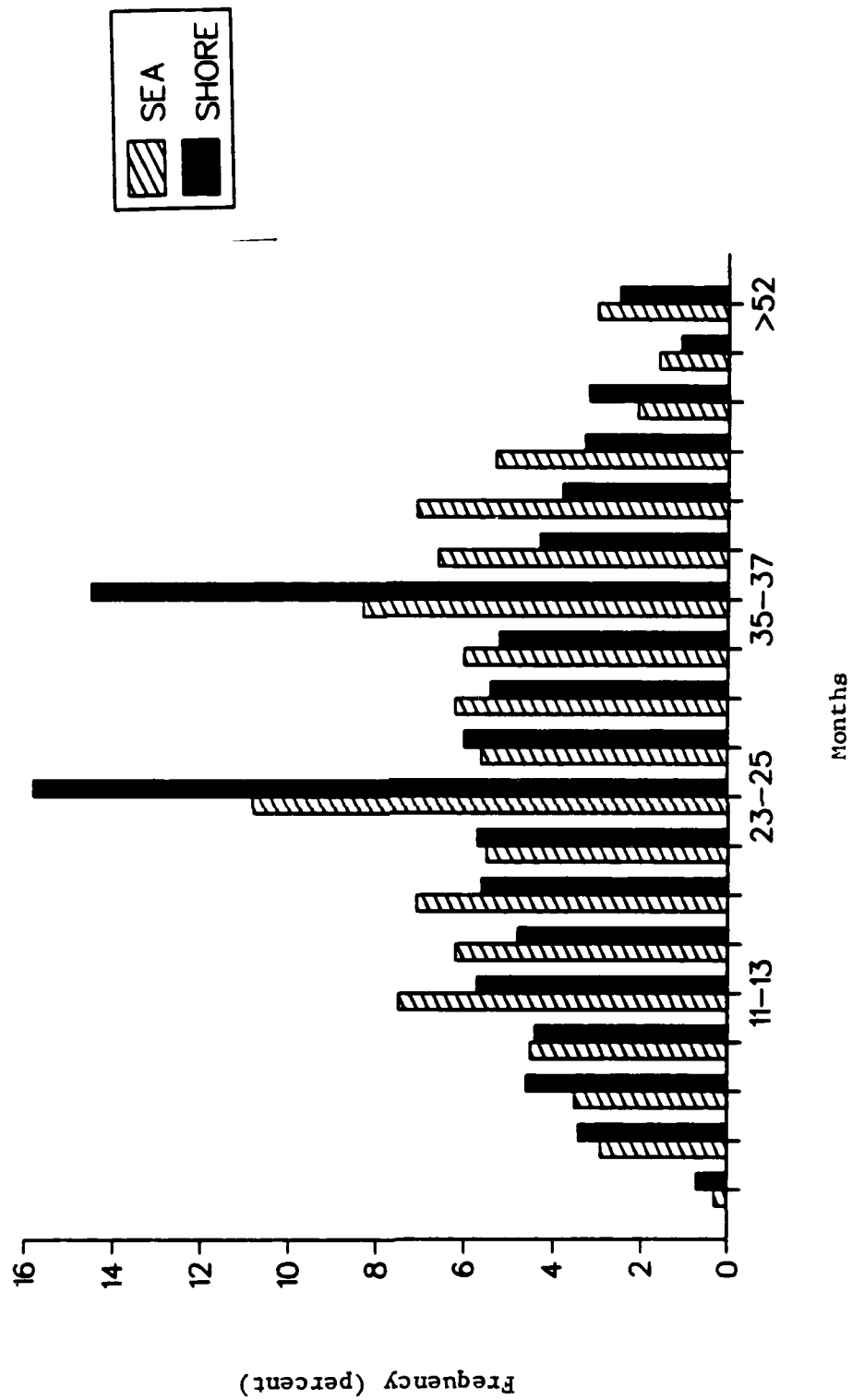


FIG. 5: LENGTH OF COMPLETED TOURS (AT SEA AND ASHORE)

mean tour length is 27.4 months for sea assignments and 26.7 months for shore jobs. There are differences in the likelihood of sea duty based on enlistment term. Table 5 displays the mean tour length by type of assignment and by enlistment term. Shore tours appear to be somewhat shorter than sea tours for first-term personnel, but a month or two longer on average for second-term and career personnel.

TABLE 4
MEAN TOUR LENGTH BY ENLISTMENT TERM
AND REENLISTMENT DECISION

| | <u>Mean (months)</u> | <u>Standard deviation (months)</u> | <u>n</u> |
|---------------------|--------------------------|--|----------|
| Overall | | | |
| Stay | 26.8 | 13.1 | 6,043 |
| Leave (end of term) | 31.4 | 12.7 | 2,766 |
| Leave (early) | 18.9 | 11.9 | 1,240 |
| First term | | | |
| Stay | 23.8 | 12.7 | 2,925 |
| Leave (end of term) | 31.7 | 11.8 | 1,887 |
| Leave (early) | 16.2 | 9.9 | 864 |
| Second term | | | |
| Stay | 29.4 | 12.5 | 1,424 |
| Leave (end of term) | 30.4 | 14.4 | 617 |
| Leave (early) | 20.3 | 12.5 | 136 |
| Career | | | |
| Stay | 29.9 | 12.9 | 1,694 |
| Leave (end of term) | 31.7 | 14.4 | 262 |
| Leave (early) | 27.6 | 13.5 | 240 |

TABLE 5
MEAN TOUR LENGTH BY DUTY TYPE
AND ENLISTMENT TERM

| <u>Length of completed tours</u> | | | |
|----------------------------------|--------------------------------|--|----------|
| | <u>Mean</u> <u>(months)</u> | <u>Standard</u> <u>deviation</u> <u>(months)</u> | <u>n</u> |
| Sea duty | | | |
| Overall | 27.4 | 13.5 | 6,173 |
| First-term | 26.9 | 13.5 | 4,142 |
| Second-term | 28.2 | 14.3 | 933 |
| Career | 28.3 | 12.6 | 1,098 |
| Shore duty | | | |
| Overall | 26.7 | 13.1 | 3,876 |
| First-term | 22.2 | 12.4 | 1,745 |
| Second-term | 29.4 | 11.4 | 1,073 |
| Career | 31.4 | 13.6 | 1,058 |

NEC BILLETS

Many billets require that, before an assignment, an individual receive specialized training in C-school (leading to the award of a Navy Enlisted Classification (NEC)). Rotation rates in these billets may have a significant effect on the amount of training the Navy must conduct. Personnel assigned to fill a billet that requires an NEC can be identified from the Distribution NEC (DNEC) field on the EMR. The field will contain the NEC identification for people filling a billet that requires an NEC and be blank otherwise.

Table 6 shows the mean length of completed tours for individuals with and without DNECs. Personnel distributed to NEC billets have tours that are 1.8 months longer, on average; however, much of the difference can be attributed to differences in the experience mix of the two samples. The differences within enlistment term are smaller, i.e., about one month.

Figure 6 compares the distribution of completed tours for career personnel with and without DNECs. The two distributions are similar, although personnel filling NEC billets are slightly more likely to serve long tours.

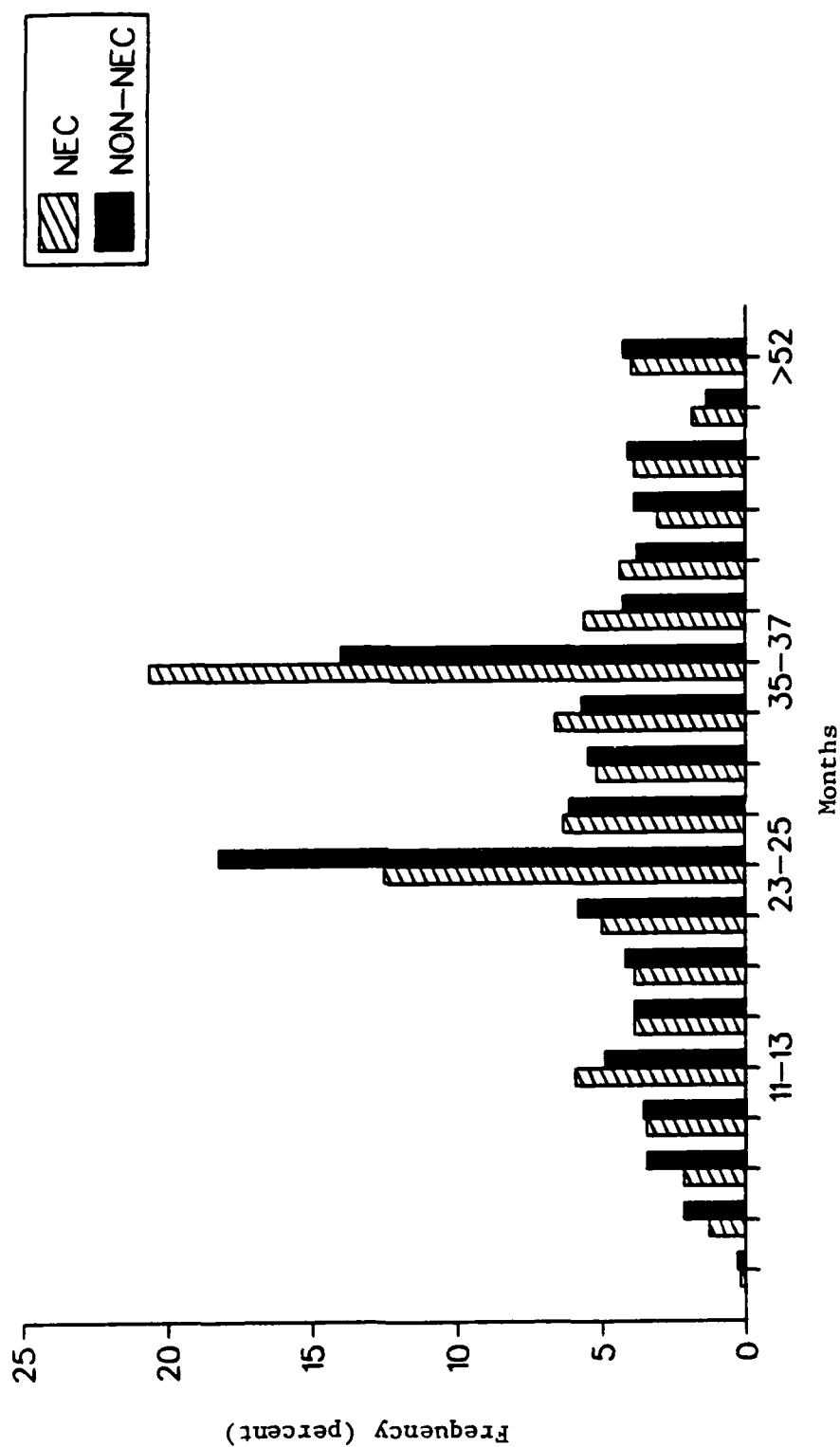


FIG. 6: LENGTH OF COMPLETED TOURS (NEC AND NON-NEC) FY 1985 AND 1986

TABLE 6
MEAN TOUR LENGTH OF NEC AND NON-NEC ASSIGNMENTS
BY ENLISTMENT TERM

| | <u>Length of completed tour</u> | | |
|----------------|---------------------------------|--|----------|
| | <u>Mean</u> <u>(months)</u> | <u>Standard</u> <u>deviation</u> <u>(months)</u> | <u>n</u> |
| NEC billet | | | |
| Overall | 28.3 | 13.2 | 3,559 |
| First-term | 25.8 | 13.5 | 1,470 |
| Second-term | 29.5 | 12.8 | 906 |
| Career | 30.3 | 12.7 | 1,183 |
| Non-NEC billet | | | |
| Overall | 26.5 | 13.4 | 6,490 |
| First-term | 25.4 | 13.3 | 4,417 |
| Second-term | 28.3 | 12.9 | 1,100 |
| Career | 29.2 | 13.7 | 973 |

CONCLUSION

The Navy experiences a substantial amount of turnover among enlisted personnel. Some of this is unplanned (precontract attrition), but much of the turnover is the result of rotation or losses upon the completion of an enlistment contract. This research memorandum summarizes information on the actual length of completed tours for a sample of more than 10,000 tours completed in 1985 and 1986.

For the entire sample, the mean length of completed tours is 27 months. There is a substantial amount of variation, however. The standard deviation is 13.3 months and the interquartile range is 20 months. The distribution of completed tours is bimodal--tours tend to be concentrated around 24 and 36 months in length.

Comparisons of different groups of personnel indicate that the distribution of tour lengths consistently follows the overall pattern, with one exception. First-term personnel have shorter tours, on average, than other personnel. In part, this difference is the result of unplanned attrition among junior personnel. Tours tend to be half a year shorter, however, even among first-termers who successfully complete their enlistments.